



# (12) 实用新型专利申请说明书

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(71) 申请人 段祚石

地址 100032 北京市海淀区路 138 号燕山大酒店  
511 号

共同申请人 张景林

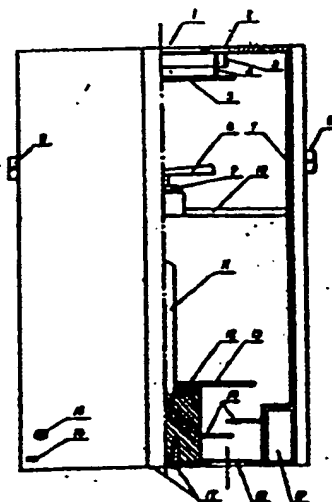
(72) 设计人 张景林 段祚石

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(54) 实用新型名称 用紫外线杀菌的空气净化器

(57) 摘要

一种用于家庭、会议室、医院、甚至车内的利用紫外线杀菌的空气净化器,包括紫外灯管(11)、灯管插座(12),在紫外灯管(11)的外面罩有箱体(2),箱体(2)里有支架(10)支撑带排风扇(6)的电动机(9),在箱体(2)上还开有进风口(18)和出风口(1),在进风口(18)与紫外灯管(11)之间有面积比进风口(18)大的遮光板(13),在出风口(1)与紫外灯管(11)之间有面积比出风口(1)大的遮光板(5),本实用新型既可避免紫外线伤害周围环境中的人和生物,又能有效地杀死空气中的细菌。



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## 权 利 要 求 书

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1. 用紫外线杀菌的空气净化器,包括紫外灯管(11)、灯管插座(12)、在紫外灯管(11)的外面罩有箱体(2),其特征在于箱体(2)里有支架(10)支撑带排风扇(6)的电动机(9),在箱体(2)上还开有进风口(18)和出风口(1),在进风口(18)与紫外灯管(11)之间有面积比进风口(18)大的遮光板(13),在出风口(1)与紫外灯管(11)之间有面积比出风口(1)大的遮光板(5)。

2. 根据权利要求1所述的空气净化器,其特征在于:在进风口(18)与紫外灯管(11)之间设有辅助遮光板(14),在出风口(1)与紫外灯管(11)之间设有辅助遮光板(3)。

3. 根据权利要求1或2所述的空气净化器,其特征在于:箱体(2)内表面设有薄铅板(7)。

4. 根据权利要求1或2所述的空气净化器,其特征在于:箱体(2)上装有控制紫外灯管(11)和电动机(9)的定时开关(15)。

5. 根据权利要求3所述的空气净化器,其特征在于:箱体(2)上装有控制紫外灯管(11)和电动机(9)的定时开关(15)。

## 用紫外线杀菌的空气净化器

本实用新型是一种用于家庭、会议室、医院、甚至车内的利用紫外线杀菌的空气净化器。

空气中含有多种对人体健康有害的细菌，例如乙型肝炎菌、呼吸道病菌、结核菌、一般细菌等。过去，为了减少这些细菌对人类的危害，人们用带灯座的紫外线灯管进行空气灭菌，从而净化空气。但这一方案存在这样的缺点：由于紫外线直接散射于空中，容易对周围的人体和生物直接构成危害；如果减弱紫外线的强度，又达不到灭菌的有效程度。

本实用新型的目的在于提供一种用紫外线灭菌的空气净化器，它既不有害于周围的人体和生物，又能有效地杀死空气中的细菌。

本实用新型是这样现的：用紫外线灭菌的空气净化器包括紫外线灯管、灯管插座、在紫外线灯管的外面罩有箱体，箱体里有支架支撑带排风扇的电动机，在箱体上还开有进风口和出风口，在进风口与紫外线灯管之间有面积比进风口大的遮光板。在出风口与紫外线灯管之间有面积比出风口大的遮光板。这样，排风扇从进风口吸进待净化的空气，然后在紫外灯光发出的紫外线作用下，空气中的细菌被杀死，空气得到净化。随后，净化后的空气在排风扇的作用下从出风口流出箱体而散布于周围环境中。如此往复循环，空气净化器四周的空气都能得到净化。由于箱体有效地遮住了紫外线，以及面积大于进风口和出风口的遮光板遮住紫外光线从进风口和出风口漏出，从而避免了紫外线对

箱体外环境的辐射，有效地保证了环境中人体和生物的安全。

为了得到更完美的遮光效果，可以在进风口与紫外灯管之间设置辅助遮光板；可以在出风口与紫外灯管之间设置辅助遮光板；可以在箱体内表面设置铅板。为了便于控制，本实用新型可以在箱体上设置控制紫外灯管和电动机的定时开关。

本实用新型具有如下优点：由于设置了箱体和遮光板，因此本实用新型与现有技术相比，可避免紫外线对周围环境的辐射，从而有效地保护了人体和生物的安全；又由于本实用新型不用担心紫外线造成损害，因而本实用新型可以增强紫外线的强度，从而更有效地杀死空气中的细菌。

下面结合附图对本实用新型进行详细说明。

图1是本实用新型一个实施例的结构示意图，其半剖视的剖面为图3中A—A剖面的一半（左、右两半对称）；

图2是本实施例的仰视图；

图3是本实施例的俯视图；

图4是本实施例中支架的俯视图。

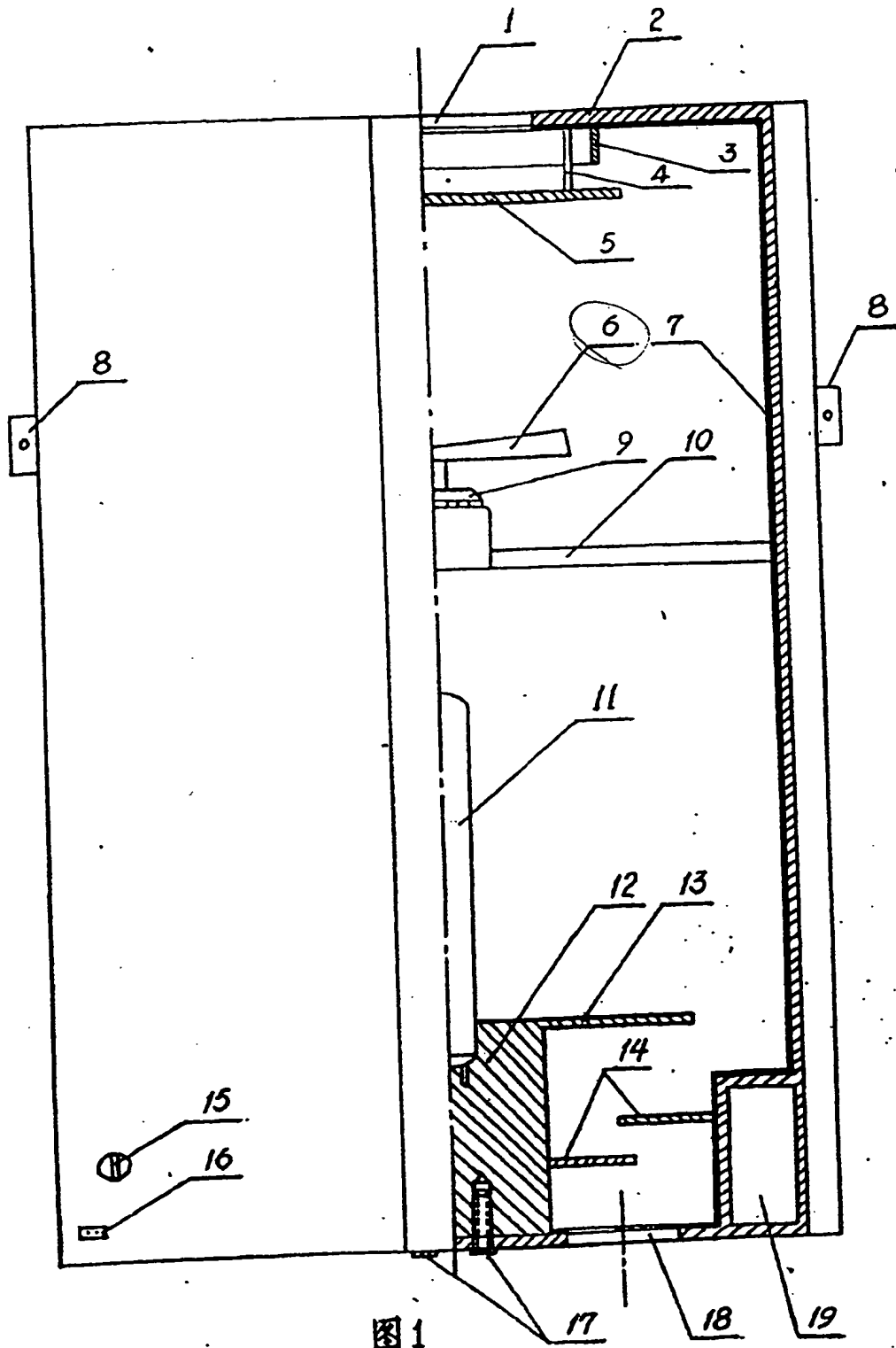
参见图1，用紫外线杀菌的空气净化器包括紫外灯管(11)、灯管插座(12)，在紫外灯管(11)的外面罩有箱体(2)，灯管插座(12)依靠螺栓(17)固定在箱体(2)的底板上。在紫外灯管(11)的上方，箱体(2)的侧板用焊接或铆接的方式固定有一支架(10)，支架(10)支撑着一个电动机(9)，电动机(9)带有排风扇(6)。支架(10)与电动机(9)接触位置形成一圆槽形状（参见图4），电动机(9)置于圆槽中，依靠紧固铝皮和紧固圈固定（图中未画出）。箱体(2)由黑色ABS工程塑料制成，其内表面用502胶粘有一层薄铅板(7)。电动机(9)采用微型电机。箱体(2)的底板上，开有1个或1个以上的进风口(18)，箱体(2)的顶板

上开有1个或1个以上的出风口(1)。进风口(18)和出风口(1)可以是圆形，也可以是其它形状。在进风口(18)与紫外灯管(11)之间，设置1块遮光板(13)，遮光板(13)的面积比进风口(18)大，以有效地挡住紫外线从进风口(18)中外漏。遮光板(13)可以与灯管插座(12)制成一体，也可以单独制作而固定在灯管插座(12)或箱体(2)上。在进风口(18)与紫外灯管(11)之间还设有1个或1个以上的辅助遮光板(14)，以便更好地阻挡紫外线从进风口(18)漏出。在出风口(1)与紫外灯管(11)之间，依靠支脚(4)将遮光板(5)固定在箱体(2)的顶板上。遮光板(5)的面积比出风口(1)大，可有效地阻止紫外线从出风口(1)中外漏。(作为另一种实施例，遮光板(5)也可以用支架固定在排风扇(6)和电动机(9)的下方箱体(2)上。)出风口(1)与紫外灯管(11)之间设有1个或1个以上的辅助遮光板(3)，以便更好地阻挡紫外线从出风口(1)漏出。辅助遮光板(3)可做成环形，遮光板(5)、(13)和辅助遮光板(14)的形状应与箱体(2)内腔横截面的形状相适应。支架(10)如图4所示，可由“十字”架构成，这样支架(10)固定在箱体(2)上后，不会堵塞气流通。当空气净化器接通电源后，紫外灯管(11)发出紫外线，同时排风扇(6)吸引空气从进风口(18)流入箱体(2)内。流入的空气绕过辅助遮光板(14)和遮光板(13)后，受到紫外线照射而灭菌。灭菌后的空气通过支架(10)后，再绕过遮光板(5)和辅助遮光板(3)从出风口(1)排出。

本实施例的箱体(2)上设置有控制紫外灯管(11)和电动机(9)的定时开关(15)。便于人们对净化器进行控制。此外，在箱体(2)上还设有安装板(8)，便于将净化器悬挂在墙上。本实施例的箱体(2)上还设有电源接口(16)；箱体(2)的底部设有小仓(19)，以放置整流器等电气元件(图中未画出)。

本实用新型的箱体横截面也可设计成圆形、椭圆形、正方形、矩形。

# 说明书附图



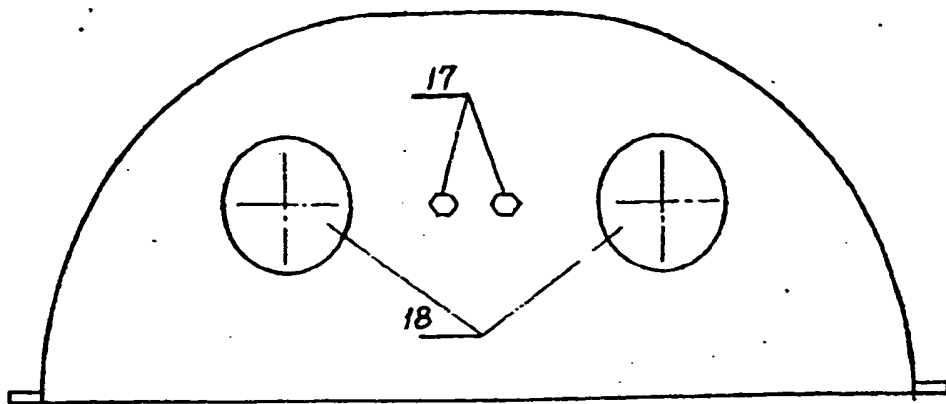


图 2

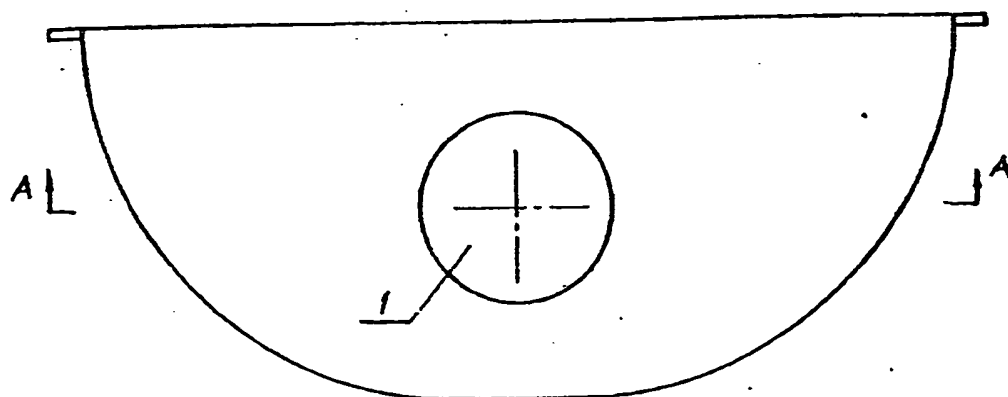


图 3

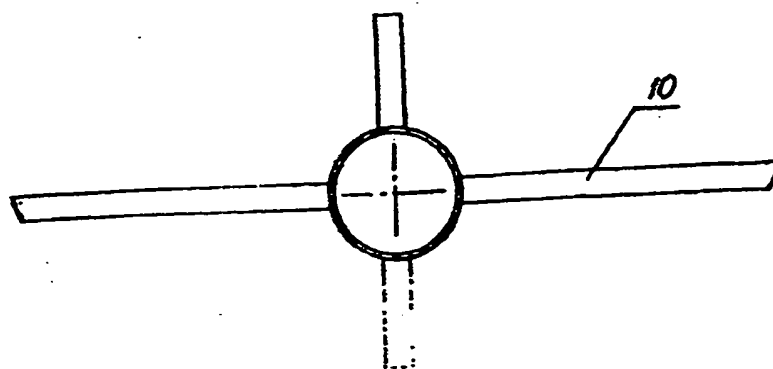


图 4



## **An air purifier for killing germs by UV radiation**

### **FIELD OF THE UTILITY MODEL**

This utility model relates to an air purifier for killing germs by UV radiation. The air purifier can be used at home, in meeting room, hospital and car.

### **BACKGROUND OF THE UTILITY MODEL**

Germs existing in air may be harmful to human health. For example, hepatitis of type II, respiratory diseases, tubercle and other diseases caused by germs. To minimize the effect of germs to the human health in the past, UV lamp is used to kill germs in the air, thereby purifying the air. However, such UV lamp has a problem. Since UV radiation directly scatters in the air, it will easily affect human being and organism. However, if the UV radiation is reduced, killing of germs cannot be achieved.

### **SUMMARY OF THE UTILITY MODEL**

The object of the utility model is to provide an air purifier for killing germs by UV radiation. It does not harm human being and organism but it kills germs in the air effectively.

The utility model is implemented as follow. An air purifier for killing germs by UV radiation comprises an UV lamp, a lamp socket and a housing. The UV lamp is located in the housing. A motor is connected to an exhaust fan which is supported by a bracket in the housing. The housing further comprises air inlets and outlets. A light shield having an area greater than the air inlet is provided between the air inlet and UV lamp. Another light shield having an area greater than the air outlet is provided between the air outlet and UV lamp. The exhaust fan draws the air to be purified from air inlet. Due to the UV radiation emitted by the UV lamp, the germs existing in the air are killed, thereby purifying the air. Subsequently, the purified air leaves the housing through the air outlet due to the exhaust fan and spreads in the surroundings. The mechanism causes the air around the air purifier to be purified. Since the housing blocks the UV radiation and the light shield prevents the leakage of UV radiation from the air inlet and air outlet thus UV radiation to the

surroundings outside the housing is minimized. This arrangement ensures the safety for human being and other organism.

To enhance the light shielding effect, a secondary light shield can be provided between the air inlet and the UV lamp. Besides, another secondary light shield can be provided between the air outlet and UV lamp. Alternatively, a lead plate can be provided in the inner surface of the housing. For ease of control, the utility model has a timing switch for controlling the UV lamp and the motor.

The present utility model has an advantage. The existence of the housing and the light shield of the present utility model, as compared with the prior art, prevents leakage of the UV radiation to the surroundings so that the safety for human being and the organism is ensured. Moreover, the intensity of UV radiation can be increased for the present utility model without concerning the harmful effect of UV radiation. Therefore, it can kill germs effectively.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

The utility model will now be described with reference to the figures.

Fig 1 is a schematic view of an embodiment according to the present utility model wherein its partial cross section is one half of the cross section taken along line A-A in fig 3. (the figure is symmetrical about the center vertical line);

Fig 2 is the bottom view of the present embodiment;

Fig 3 is the top view of the present embodiment;

Fig 4 is the top view of the bracket of the present embodiment.

### **DETAILED DESCRIPTION OF THE DRAWINGS**

Referring to fig 1, the air purifier for killing germs using UV radiation comprises an UV lamp 11, a lamp socket 12 and a housing 2. The UV lamp 11 is located in the housing 2. The lamp socket 12 is mounted on the bottom of the housing 2 by a bolt 17. The side of the housing 2 is soldered or pivotly jointed to the bracket 10 above the UV lamp 11. The bracket 10 supports a motor 9 which is connected to the exhaust fan 6. A circular groove is formed at the contact of bracket 10 and the motor 9 (as seen by fig 4). The motor 9 is located in the circular groove and is fixed by an aluminium skin and a ring (not shown in

the figure). The housing 2 is made of black ABS engineering plastic. The inner surface sticks to a thin lead plate using 502 adhesive. The motor 9 is a micro-motor. The bottom of the housing 2 has at least one air inlet 18. The top of the housing 2 has at least one air outlet 1. The air inlet 18 and outlet 1 can be circular or any possible shapes. The light shield 13 having an area larger than air inlet 18 is provided between air inlet 18 and UV violet 11 in order to prevent leakage of UV radiation from the air inlet 18. The light shield 13 can be integrally constructed with the lamp 12. Alternatively, it can be separately constructed and mounted on the lamp socket 12 or the housing 2. At least one secondary light shield 14 is provided between the air inlet 18 and UV lamp 11 in order to prevent leakage of UV radiation from the air inlet 18. The light shield 5 is mounted on the top of the housing 2 between the air outlet 1 and UV lamp 11 by a support member 4. The light shield 5 has an area larger than the air outlet 1. It can further prevent leakage of UV radiation from the air outlet 1. (As an embodiment, the light shield 5 can be mounted on the exhaust fan 6 and the housing 2 under the motor 9 with a bracket.) At least one secondary light shield 3 is provided between the air outlet 1 and UV lamp 11 in order to prevent the leakage of UV radiation from the air inlet 1. The secondary light shield 3 can be circular. The shape of the light shield 5, 13 and the secondary light shield 14 correspond to the shape of the inner cross section of the housing 2. As shown in fig 4, the bracket 10 can be a "cross". Mounting the bracket 10 on the housing 2 will not block the air path. When the air purifier is powered up, the UV lamp emits UV radiation and the exhaust fan 6 draws the air from the air inlet into the housing 2. The incoming air goes past the secondary light shield 14 and light shield 13. The germs is killed by UV radiation. After the purified air goes past the bracket 10, the air then goes past the light shield 5 and secondary light shield 3 and goes out from the air outlet 1.

The housing 2 of the present embodiment has a timing switch 15 for controlling the UV lamp 11 and motor 9. This arrangement facilitates the control of the air purifier. Besides, the housing 2 is further provided with mounting plate 8 for hanging the air purifier on the wall. Moreover, the housing 2 is provided with power connector 16. The bottom of the housing 2 has a room 19 for locating some electrical components such as rectifier (not shown in the figure).

The cross section of present utility model can be designed as a circle, an ellipse, a

square or a rectangle.

## CLAIMS

1. A air purifier for killing germs by UV radiation comprises an UV lamp (11), lamp socket (12), a housing (2) for holding the UV lamp (11) wherein a motor is connected to a exhaust fan (6) supported by a bracket in the housing (2); air inlets (18) and outlets (11) are provided on the housing (2); a light shield (13) having an area greater than air inlet (18) is provided between the air inlet (18) and UV lamp (11); another light shield (5) having an area greater than air outlet (1) is provided between air outlet (1) and UV lamp (11).
2. The air purifier of claim 1 wherein a secondary light shield (14) is provided between the air inlet (18) and the UV lamp (11) and another secondary light shield (3) is provided between the air outlet (1) and UV lamp (11).
3. The air purifier of claim 1 or 2 wherein the housing (2) has a thin lead plate (7) on its inner surface.
4. The air purifier of claim 1 or 2 wherein the housing (2) has a timing switch (15) for controlling the UV lamp (11) and the motor (9).
5. The air purifier of claim 3 wherein the housing (2) has a timing switch (15) for controlling the UV lamp (11) and the motor (9).

## ABSTRACT

### An air purifier for killing germs by UV radiation

An air purifier being used at home, in meeting room, hospital and car kills germs by UV radiation. The air purifier comprises an UV lamp (11), lamp socket (12) and a housing (2). The UV lamp (11) is located inside a housing (2). A motor (9) is connected to an exhaust fan which is supported by a bracket in the housing. The housing (2) further comprises air inlets (18) and outlet (1). A light shield (13) having an area greater than the air inlet (18) is provided between the air inlet (18) and UV lamp (13). Another light shield (5) having an area greater than the air outlet (1) is provided between the air outlet (1) and UV lamp (11). This utility model can prevent the harmful effect of UV radiation to human being and organism in the environment and kill the germs in the air effectively.